PowerEdge M710HD

Technical Guide

Designed for enterprise database and virtualization deployments, the PowerEdge M710HD features tremendous I/O throughput, maximized memory density, and robust processing power.

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1 Product Comparison

1.1 Overview

The Dell™ PowerEdge™ M710HD blade server helps you run business applications efficiently, reduce your data center footprint, ease data management, and trim system maintenance time.

The PowerEdge M710HD is a data-center, virtualization-optimized blade that offers tremendous I/O throughput, maximized memory density, and robust optional Intel® Xeon® 5600 processing power, all in an ultra-dense form factor with enterprise-class high availability. The PowerEdge M710HD has the option to set up redundant, mirrored SD cards through a BIOS setting.

1.2 Rack-Dense Performance

Unleash the power of massive I/O throughput, core-rich Intel Xeon processors, and an abundance of DDR3 DIMMs on your toughest data center workloads. With massive I/O throughput, powerful multi-core processing and ultra-high-density memory options, the PowerEdge M710HD blade server can let you flex your data center muscles while taking on the toughest workloads. Flexible and robust I/O deployment is achievable through multiple iSCSI, Ethernet, FibreChannel and InfiniBand options with additional future integrated network connectivity through the network daughtercard (NDC). Processing power from up to 12 Intel Xeon 5600 series cores and maximized RAM density with 18 DIMM slots allows for condensed full-height blade horsepower and cost-efficient DDR3 memory scaling in an ultra-dense form factor.

1.3 Efficiency Without Compromise

Increase your capability to deploy virtualized solutions that can reduce power consumption while increasing performance capacity. The expanded addressable memory in the PowerEdge M710HD allows you to use more virtual machines from your existing hypervisor licensing, helping you save money, and increase your virtualized deployments using existing resources. Optimized airflow design coupled with high-efficiency fans and power supplies enable the Dell M1000e blade enclosure to effectively power and cool PowerEdge M710HD servers while helping to reduce overall power draw. This allows you to reclaim power for use elsewhere in your data center, save on operational costs, and help the environment.

1.4 Enterprise-Class Reliability and Management

Spend more time on your business and less on maintaining your IT with embedded system management features on the PowerEdge M710HD and the Chassis Management Controller (CMC). The PowerEdge M710HD blade server is designed to ease your mind and reduce your operating costs delivering the closest thing to a worry-free data center. Optional failsafe embedded hypervisors and hard drive fault tolerance through a hardware RAID controller offer protective redundancy that safeguards your organization’s data from loss or corruption. Simplified systems management is achieved through automated discovery which automates configuration of new hardware and enables pre-provisioning of LAN/SAN resources.

In addition, one-to-many updating through the CMC and Virtual File Share simplifies the update process for BIOS, firmware, and drivers without additional software. Proactive management provides immediate access to system status, issues, and alerts through a single, easy-to-use interface that includes one-click key functions to help quickly resolve issues.

1.5 Comparison

The PowerEdge M710HD is an optimized blade solution for customers looking for large capacity memory capabilities and I/O scalability in a dense, easy-to-deploy, half-height blade form factor. Table 1 compares the PowerEdge M710HD blade server to the PowerEdge M710, M610x, and M610 servers.

Table 1. Product Comparison

	M710HD	M710	M610x	M610
Description	General purpose Half-height 2S	General purpose Full-height 2S	Special purpose Full-height 2S	General purpose Half-height 2S
Processor	Intel Xeon Processor 5500 or 5600 Series			
Front Side Bus	Two Intel QuickPath Interconnect (QPI) links			
Sockets	Two			
Cores	Up to six			
L2/L3 Cache	8MB (5500 Series) or 12MB (5600 Series)			
Chipset	Intel 5520	Intel 5520	Intel 5500	Intel 5500
DIMMs	18 x DDR3 DIMMs (800/1066/1333MHz)	18 x DDR3 DIMMs (800/1066/1333MHz)	12 x DDR3 DIMMs (800/1066/1333MHz)	12 x DDR3 DIMMs (800/1066/1333MHz)
Min/Max RAM	4GB/288GB	4GB/288GB	4GB/192GB	4GB/192GB
Form Factor	Half-height blade, dual socket	Full-height blade, dual socket	Full-height blade, dual-socket/ expansion module	Half-height blade, dual socket
Hard Drive Bays (2.5" only)	SAS: 2 x 2.5" (hot-plug) SSD SATA: 2 x 2.5"	SAS: 4 x 2.5" (hot-plug) SSD SATA: 2 x 2.5"	SAS: 2 x 2.5" (hot-plug) SATA: 1 x 2.5"	SAS: 2 x 2.5" (hot-plug) SATA: 1 x 2.5"
Hard Drive Types	SAS/SSD			
Hard Drive Controller	Embedded H200	PERC H200 PERC H700 CERC 6/i	PERC H200 PERC H700 PERC H800 SAS 6/E	PERC H200 Non-RAID SATA (one hard drive only)
Optional Hard Drive Controller		SAS 6/iR PERC 6/i with RAID battery	SAS 6/iR PERC 6/i with RAID battery	SAS 6/iR PERC 6/i with RAID battery
Availability	Hot-plug hard drives ECC memory Single Device Data Correction (SDDC) Supports memory demand and patrol scrubbing High-availability failover cluster support			
Server Management	Integrated Dell Remote Access Controller iDRAC6 Express/Enterprise (both standard) with IPMI 2.0 +vMedia/vKVM, and CMC (on the PowerEdge M1000e chassis)			

	M710HD	M710	M610x	M610
Mezz Slots	2 x8 PCIe Mezzanine Cards	1 x4 and 3 x 8 PCIe Mezzanine Cards	2 x8 (PCI Gen 2); Fabric B limited to a small form factor (SFF) mezzanine card	2 x8 (PCI Gen 2); Fabric B limited to a small form factor (SFF) mezzanine card
I/O slots	NA	NA	Two x16 PCIe Gen2 H800/6GB SAS NVIDIA® M1060 and M2050-204	NA
RAID	0, 1	0, 1, 5	0, 1	0, 1
NIC/LOM	4 x 1GbE dual Broadcom® BCM5709S 2 x 10GbE Broadcom BCM57712-k	4 x TOE with optional iSCSI offload	2-port Broadcom® 5709S 1Gb with TOE plus optional iSCSI Accelerator	2-port Broadcom® 5709S 1Gb with TOE plus optional iSCSI Accelerator
USB	2 x external USB 2.0 ports at front bezel 1 x internal USB port	3 x external USB 2.0 ports at front bezel 1 x internal USB port	2 external, 1 internal	2 external, 1 internal
SD Card	2 x internal SD slot 1 for persistent storage 1 for management (can also be configured as redundant SD cards for embedded hypervisor)	1 x internal SD slot 1 for persistent storage 1 for management	1 for persistent storage 1 for management	1 for persistent storage 1 for management
TPM	Yes (Trusted Computing Module [TCM] used in China)			
Video	Matrox® G200eW integrated into iDRAC chip			
Power Supplies	See the PowerEdge M1000e Technical Guide.			
Fans	See the PowerEdge M1000e Technical Guide.			
Chassis	See the PowerEdge M1000e Technical Guide.			

2 Key Technologies

2.1 Overview

The Dell™ PowerEdge™ M710HD is a half-height blade server with the following features:

- Dual quad-core or six-core Intel® Xeon® processors 5500 and 5600 series
- DDR3 memory
- PCI Express Generation 2 (PCIe Gen2)
- Optional redundant, mirrored SD cards
- iDRAC6 Enterprise with integrated video controller

2.2 Dual Intel Xeon Quad-Core and Six-Core Processors

The Intel Xeon processor 5500 and 5600 series features quad-core and six-core processing to maximize performance and performance/watt for data center infrastructures and highly dense deployments. The Intel Xeon processor 5500 series 2S family of processor also features Intel Core™ micro-architecture and Intel 64 architecture for flexibility in 64-bit and 32-bit applications and operating systems.

2.3 DDR3 Memory

The M710HD uses DDR3 memory which provides a high-performance, high-speed memory interface capable of low latency response and high throughput. The M710HD supports registered ECC DDR3 DIMMs (RDIMMs).

The DDR3 memory interface consists of three channels, with up to three RDIMMs per channel for single/dual-rank and up to two RDIMMs per channel for quad rank. The interface uses 2 GB, 4 GB, 8 GB, or 16 GB RDIMMs. The memory mode is dependent on how the memory is populated in the system.

2.4 PCI Express Generation 2

PCIe is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports is backwards-compatible with Gen1 transfer rates.

2.5 Network Daughtercard

The Network Daughtercard (NDC) is flexible LAN-on-motherboard (LOM) networking solution with integration into embedded management and configuration subsystems.

2.6 Redundant Internal SD Module

The Internal SD Module is dedicated for an SD Flash Card with embedded hypervisor for virtualization. The SD Flash Card contains a bootable OS image for virtualized platforms. The persistent storage solution on the M710HD allows for redundant SD cards.

2.7 iDRAC6 Enterprise

The iDRAC6 Enterprise feature set is a managed persistent storage space for server provisioning data. It consists of 1GB flash and vFlash media (an optional externally accessible SD card). vFlash offers the hot-plug portability and increased storage capacity benefits of SD while still being managed by the system.

3 System Information

3.1 Overview

The PowerEdge™ M710HD is an optimized solution with large capacity memory capabilities and I/O scalability in a dense, easy-to-deploy blade form factor. Its key differentiators are superior memory scalability and granularity, new management capabilities with iDRAC and Lifecycle Controller, internal persistent storage, two internal hard drives, and trusted platform module (TPM) support. The M710HD can be a valuable asset in High Performance Cloud Computing (HPCC), messaging, database, and virtualization solutions.

3.2 Product Features Summary

Table 2 summarizes the product features for the PowerEdge M710HD. For the latest information on supported features for the PowerEdge M710HD, visit Dell.com.

Table 2. Product Features

Feature	Technical Specifications
Processors	Quad-core or six-core Intel® Xeon® processor 5500 and 5600 series
Chipset	Intel 5520
Memory[1]	Up to 288GB (18 DIMM slots): 1GB/2GB/4GB/8GB/16GB ECC DDR3 up to 1333MHz
Hard Drive Bays	Two 2.5" SAS/SSD hot-plug drives
Storage[1]	**Internal Hot-Plug Hard-Drive Options:** 2.5" SATA SSD, SAS (10K, 15K) 2.5" SAS (15K rpm): 73GB or 146GB Solid State Drives (SSD): 50GB, 100GB, or 149GB **Maximum Internal Storage:** Up to 2TB per blade **External Storage:** For more information about Dell external storage solutions, visit Dell.com/Storage.
RAID Controller Options	PERC H200 Integrated SAS Controller (6Gb/s)
I/O Mezzanine Card Options	Fully populated mezzanine card slots and switch modules will yield three redundant I/O fabrics per blade. **1Gb and 10Gb Ethernet:** Dual-Port Broadcom® Gb Ethernet with TOE (BCM5709S) Quad-Port Intel Gb Ethernet Quad-Port Broadcom Gb Ethernet (BCM5709S) Dual-Port Intel 10Gb Ethernet Dual-Port Broadcom 10Gb Ethernet (BCM57711) Brocade® BR1741M-k Dual-Port Mezzanine CNA

Feature	Technical Specifications
	Infiniband: Dual-Port Mellanox® ConnectX-2™ Dual Data Rate (DDR) and Quad Data Rate (QDR) InfiniBand **10Gb Enhanced Ethernet and Converged Network Adapters (CEE/DCB/FCoE):** Dual-Port Intel 10Gb Enhanced Ethernet (FCoE Ready for Future Enablement) Dual-Port Emulex® Converged Network Adapter (OCM10102-F-M)—Supports CEE/DCB 10GbE + FCoE Dual-Port Qlogic® Converged Network Adapter (QME8142)—Supports CEE/DCB 10GbE + FCoE Dual-Port Qlogic Converged Network Adapter (QME8242-k)—Supports 10GbE + NPAR **Fibre Channel:** Dual-Port QLogic FC8 Fibre Channel Host Bus Adapter (HBA) (QME2572) Dual-Port Emulex FC8 Fibre Channel Host Bus Adapter (HBA) (LPe1205-M) Emulex 8 or 4 Gb/s Fibre channel Pass-through module
Communications	Two embedded Broadcom® NetXtreme II™ 5709 Gigabit Ethernet NICs with failover and load balancing. TOE (TCP/IP Offload Engine) supported on Microsoft® Windows Server® 2003 SP1 or higher with Scalable Networking Pack. iSCSI Offload supported on Windows Server® 2003 SP1 or higher, Red Hat® Enterprise Linux® 5, and SUSE® Linux® Enterprise Server 10. Scalable Networking Pack for Windows Server® 2003 is not required. Boot from SAN (iSCSI and FC) supported Optional add-in NICs: see I/O Mezzanine Cards Optional add-in HBAs: see I/O Mezzanine Cards
Operating Systems	Microsoft® Windows Server® 2008 SP2, x86/x64 (x64 includes Hyper-V™) Microsoft Windows Server 2008 R2 SP1, x64 (includes Hyper-V™ v2) SUSE® Linux® Enterprise Server v11, x86/x64, SP1 Red Hat® Enterprise Linux® Server v5.5, x86/64 Red Hat Enterprise Linux AS/ES v4.8, x86/64 For more information on the specific versions and additions, visit Dell.com/OSsupport.
Virtualization OS Options	Citrix® XenServer™ Microsoft Hyper-V™ through Microsoft Windows Server® 2008 VMware® vSphere™ 4.1 (including VMware ESX® v4.1, ESXi™ v4.1, or ESXi 5.0)
Management Options	Dell™ OpenManage™ software tools Dell Management Console Integration with 3rd party management solutions via the Dell Certified Partner Program Altiris™ Deployment Solution for Dell Blade Servers Designed to help reduce deployment time from hours to minutes Integrated Dell Remote Access Controller (iDRAC) Out-of-Band alerting, status, inventory, and troubleshooting via Secure Web GUI/CLI (telnet/SSH) Console Redirection

Feature	Technical Specifications
	vMedia (virtual media) map optical or hard drives to the blade from remote workstations over a network vKVM (virtual KVM) out-of-band remote console redirection; supports Java or ActiveX plug-ins IPMI 2.0 support
Power Supply	Supplied by Dell PowerEdge M1000e Blade Chassis
Video	Integrated Matrox® G200 with 8MB memory
Systems Management	BMC, IPMI2.0 compliant Dell OpenManage featuring Dell Management Console Unified Server Configurator Lifecycle Controller iDRAC6 Enterprise with optional vFlash media
[1] GB means 1 billion bytes and TB equals 1 trillion bytes; actual capacity varies with preloaded material and operating environment and will be less.	

4 Mechanical

4.1 Chassis Description

The Dell™ PowerEdge™ M710HD is a half-height blade server that requires an M1000e chassis to operate.

Figure 1. PowerEdge M1000e Blade Enclosure

The M710HD blade server occupies one half-height slot vertically in the M1000e chassis for a maximum of 16 blades in one M1000e chassis. It can be mixed with other existing Dell blades of half-height or full-height form factors, and designed to mix with possible future half-height-double-wide and full-height-double-wide blades. Some highlights are:

- First Dell blade with support for network daughtercard
- Support for 18 DIMMs in a half-height form factor
- Support for persistent storage (internal USB connector and two external SD card slots)

Refer to the PowerEdge M1000e Technical Guide for information on fans, power and power supply, racks, security, and other chassis information.

4.2 Dimensions and Weight

The PowerEdge M710HD dimensions and weight are as follows:

- **Height**: 18.9cm (7.4in)
- **Width**: 5cm (2in)
- **Depth**: 48.6cm (19.2in)
- **Weight (maximum configuration)**: 7.4kg (16.3lb)

4.3 Internal Module

A view of the internal module is shown in Figure 2. See Opening and Closing the Blade in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals for more information.

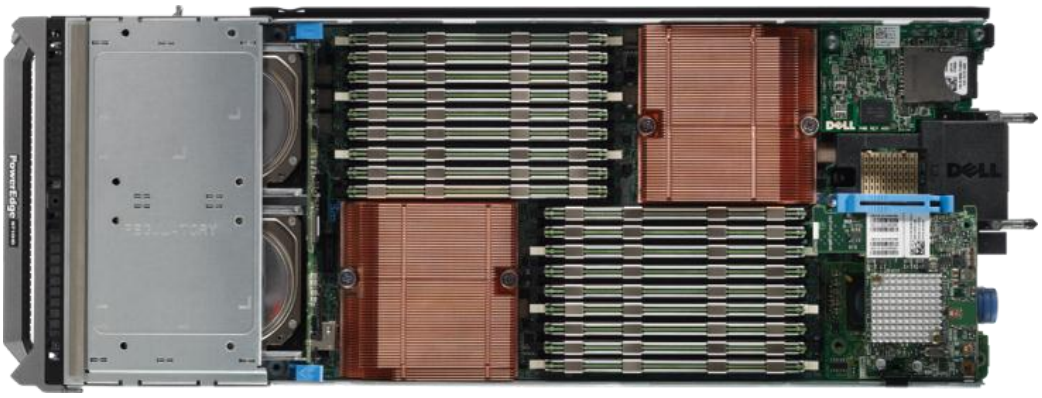

Figure 2. Internal Module View

4.4 Security

Configurable client IP address range for clients connecting to iDRAC6.

4.5 Cover Latch

The blade module includes a latch for the cover. See Opening and Closing the Blade in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals for more information.

4.6 TPM (Trusted Platform Module)

The TPM is used to generate/store keys, protect/authenticate passwords, and create/store digital certificates. TPM can also be used to enable the BitLocker™ hard drive encryption feature in Windows Server 2008.

TPM is enabled through a BIOS option and uses HMAC-SHA1-160 for binding. A Trusted Computing Module (TCM) version of the planar is available for use where TCM is the standard, for example, in China.

4.7 Power Off Security

Through the BIOS, the front blade server USB ports and power button can be disabled so as to not allow any control of the system from the front of the blade. The enclosure video can also be restricted.

The BIOS System Setup program's system security screen allows administrators to set the system password, control TPM activation and reporting, clear the TPM's memory, and disable the power button and USB ports.

4.8 iDRAC6 Security Features

The iDRAC6 modular solution offers many security features including:

- User authentication through Microsoft Active Directory, generic LDAP Directory Service, or locally administered user IDs and passwords
- Two-factor authentication provided by the Smart-Card logon feature; the two-factor authentication is based on what the users have (the Smart- Card) and what they know (the PIN)
- Role-based authorization, which enables an administrator to configure specific privileges for each user
- User ID and password configuration

- SM-CLP and Web interfaces that support 128-bit and 40-bit encryption (for countries where 128 bit is not acceptable), using the SSL 3.0 standard
- Session time-out configuration (in seconds)
- Configurable IP ports (where applicable)
- Secure Shell (SSH), which uses an encrypted transport layer for higher security
- Login failure limits per IP address, with login blocking from that IP address when the limit is exceeded

For greater security, access to iDRAC6 configuration through iDRAC6 Configuration Utility or the local RACADM CLI can be disabled by means of a RACADM command or from the GUI.

4.9 USB

The M710HD supports the following USB devices:

- DVD (bootable; requires two USB ports)
- USB Key (bootable)
- Keyboard (only one USB keyboard is supported)
- Mouse (only one USB mouse is supported)

4.10 Battery

A replaceable coin cell CR2032 3V battery is mounted on the planar to provide backup power for the Real-Time Clock and CMOS RAM on the ICH9 chip.

4.11 Field Replaceable Units (FRU)

The planar contains a serial EEPROM to contain FRU information including Dell part number, part revision level, and serial number.

4.12 User Accessible Jumpers, Sockets, and Connectors

See System Board Information in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals for more information.

5 Power, Thermal, Acoustic

5.1 Power Supplies

See the PowerEdge M1000e Technical Guide for information on power supplies and power supply specifications.

5.2 Power Efficiency

One of the main features of blade servers is enhanced power efficiency. The PowerEdge™ M710HD achieves higher power efficiency by implementing the following features:

- User-configurable power options through the M1000e Chassis Management Controller (CMC) (see M1000e documentation on Support.Dell.com/Manuals for further details)
- Improved power budgeting
- Voltage Regulator (VR) efficiency improvements
- Processor VR dynamic phase shedding
- Switching regulators instead of linear regulators
- Closed loop thermal throttling
- DDR3 and LV-DDR3 memory
- Memory VR static phase shedding
- BIOS Power/Performance options page
- Active Power Controller (BIOS-based processor P-state manager)
- Ability to power down or throttle memory
- Ability to disable a processor core
- Ability to turn off embedded NICs or PCIe lanes when not being used
- Option to run PCIe at Gen1 speeds instead of Gen2
- Energy Smart components at the M1000e chassis level to selectively enable more computing performance with less power consumption.

5.3 Thermal Operating and Storage Specifications

Thermal specifications for the PowerEdge M710HD are detailed in Table 3 along with other important operating and storage information.

Table 3. Operating and Storage Specifications

Temperature	
Operating	10°C to 35°C (50°F to 95°F) with a maximum temperature gradation of 10°C per hour Note: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F/550 ft.
Storage	-40°C to 65°C (-40°F to 149°F) with a maximum temperature gradation of 20°C per hour
Relative humidity	
Operating	20% to 80% (noncondensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (noncondensing) with a maximum humidity gradation of 10% per hour

Maximum vibration	
Operating	0.26 Grms at 5Hz-350Hz in operational orientations
Storage	1.54 Grms at 10 Hz-250Hz in all orientations
Maximum shock	
Operating	Half sine shock in all operational orientations of 31 G +/- 5% with a pulse duration of 2.6 ms +/-10%
Storage	Half sine shock on all six sides of 71 G +/- 5% with a pulse duration of 2 ms +/-10% Square wave shock on all six sides of 27 G with velocity change @ 235 in/sec or greater
Altitude	
Operating	-16m to 3048m (-50ft to 10,000ft) Note: For altitudes above 2950 feet, the maximum operating temperature is derated 1°F/550 ft.
Storage	-16m to 10,600m (-50ft to 35,000ft)

5.4 Acoustics

The acoustical design of the PowerEdge M710HD reflects adherence to Dell's high sound quality standards. Sound quality is different from sound power level and sound pressure level in that it describes how humans respond to annoyances in sound, like whistles or hums. Definitions for acoustical performance data are as follows:

- **Idle:** Reference ISO7779 (1999) definition 3.1.7; system is running in its OS but no other specific activity.
- **LwA-UL:** The upper limit sound power level (LwA) calculated per section 4.4.2 of ISO 9296 (1988) and measured in accordance to ISO 7779 (1999).

Table 4 shows the acoustical performance for a typical configuration of the M1000e chassis with eight PowerEdge M710HD blade servers installed. Acoustical performance varies with hardware configurations.

Table 4. Acoustical Performance of M1000e Chassis with Eight M710HD Blades Installed

Typical Configuration (per blade) @ 23±2°C Ambient in M1000e Chassis			Operating Mode	LwA-UL (bels)	Tones
Processors	Hard Drives	DIMMs			
2 x Intel® Xeon® processors 5600 series (80W)	2 x 2.5" SAS (15K) 736GB	12 x 4GB dual-rank	Standby	7.1	No prominent tones
			Idle	7.5	No prominent tones
			Stress	8.2	No prominent tones

5.5 Thermal

The M710HD thermal solution includes:

- Optimized airflow impedance for individual blade and chassis level airflow balancing
- Custom air baffling to direct air flow through the components to maintain proper cooling
- Custom-designed heat sinks that maintain processor, DIMM, and board-level chip temperatures within thermal design targets
- Highly optimized fan control algorithm:
    - Base fan speeds are a function of hardware configuration and ambient temperature to minimize airflow for a given environment.
    - PID control algorithms are used for both processor, DIMMs, and NDC to maintain appropriate thermal margin

6 Processors

6.1 Overview

The Intel® Xeon® processors 5500 and 5600 series are designed specifically for servers and workstation applications. These processors feature quad-core processing to maximize performance and performance/watt for data center infrastructures and highly dense deployments. They feature Intel Core™ micro-architecture and Intel 64 architecture for flexibility in 64-bit and 32-bit applications and operating systems and use a 1366-contact Flip-Chip Land Grid Array (FC-LGA) package that plugs into a surface-mount socket. The M710HD provides support for up to two 2S processors.

6.2 Features

Key features of the Intel Xeon processor 5500 series include:

- Up to four cores per processor
- Two point-to-point QuickPath Interconnect links at 6.4 GT/s
- 45 nm process technology
- No termination required for non-populated processors (must populate CPU1 socket first)
- Integrated QuickPath DDR3 memory controller
- 64-byte cache line size
- RISC/CISC hybrid architecture
- Compatible with existing x86 code base
- Intel MMX™ support
- Execute Disable Bit
- Intel Wide Dynamic Execution
- Executes up to four instructions per clock cycle
- Simultaneous Multi-Threading (SMT) capability
- Support for CPU Turbo Mode (on certain models)
- Increases processor frequency if operating below thermal, power and current limits
- Streaming SIMD (Single Instruction, Multiple Data) Extensions 2, 3, and 4
- Intel 64 Technology
- Intel VT-x and VT-d Technology for virtualization support
- Enhanced Intel SpeedStep® Technology
- Demand-based switching for active processor power management as well as support for ACPI P-States, C-States and T-States

The Intel Xeon processor 5600 series encompasses all the features of the 5500 series along with:

- Support for DDR3L, 1.35v DIMMs for even lower system power
- Support for memory sparing
- AES-NI (hardware encryption assist) for more efficient encryption for uses such as online transactions SSL.
- Intel TXT (Trusted Execution Technology) provides hardware assisted protection against emerging software attacks

Table 5. Comparison of Processor Technology

Intel Xeon Processor	5400 Series	5500 Series	5600 Series
Cores	4	4	6
Last Level Cache	2 x 6MB shared	8MB shared	12MB shared
FSB (MHz) / Link Frequency (GT/s)	1333MHz	Up to 6.4 GT/s	Up to 6.4 GT/s
Max TDP	120W	130W for workstation 95W for server	130W for workstation and server
Max Frequency	>3GHz	>3GHz	>3GHz
Memory Controller	Separate in chipset	Integrated 3-channel DDR3	Integrated 3-channel DDR3
Process Technology	45nm	45nm	32nm
Intel Trusted Execution Technology	No	No	Yes
Intel Advanced Encryption Security- New Instructions	No	No	Yes
Intel Virtualization Technology	Yes	Yes	Yes
Intel 64	Yes	Yes	Yes
Intel Hyper-Threading Technology	No	Yes	Yes
Socket	LGA771	LGA1366	LGA1366

6.3 Supported Processors

Supported processors are detailed in Table 6.

Table 6. Supported Processors

Model	Speed	TDP Power	Cache	Cores	Usage Type	Max Memory Speed	QPI Link Speed	Turbo Mode Enabled	Hyper-threading
X5675	3.06GHz	95W	12M	6	Advanced	1333MHz	6.4GT/s	Yes	Yes
X5670	2.93GHz	95W	12M	6	Advanced	1333MHz	6.4GT/s	Yes	Yes
X5660	2.8GHz	95W	12M	6	Advanced	1333MHz	6.4GT/s	Yes	Yes
X5650	2.66GHz	95W	12M	6	Advanced	1333MHz	6.4GT/s	Yes	Yes
E5645	2.4GHz	80W	12M	6	Standard	1333MHz	5.86GT/s	Yes	Yes
E5649	2.53GHz	80W	12M	6	Standard	1333MHz	5.86GT/s	Yes	Yes
L5640	2.26GHz	60W	12M	6	Low Voltage	1066MHz	5.86GT/s	Yes	Yes
X5667	3.06GHz	95W	12M	4	Advanced	1333MHz	6.4GT/s	Yes	Yes

Model	Speed	TDP Power	Cache	Cores	Usage Type	Max Memory Speed	QPI Link Speed	Turbo Mode Enabled	Hyper-threading
X5672	3.2GHz	95W	12M	4	Advanced	1333MHz	6.4GT/s	Yes	Yes
E5640	2.66GHz	80W	12M	4	Standard	1066MHz	5.86GT/s	Yes	Yes
E5630	2.53GHz	80W	12M	4	Standard	1066MHz	5.86GT/s	Yes	Yes
E5620	2.4GHz	80W	12M	4	Standard	1066MHz	5.86GT/s	Yes	Yes
L5630	2.13GHz	40W	12M	4	Low Voltage	1066MHz	5.86GT/s	Yes	Yes
L5609	1.86GHz	40W	12M	4	Low Voltage	800MHz	4.8GT/s	No	No
E5607	2.26GHz	80W	8M	4	Standard	1066MHz	4.8GT/s	Yes	Yes
E5606	2.13GHz	80W	8M	4	Standard	1066MHz	4.8GT/s	Yes	Yes
E5603	1.6GHz	80W	4M	4	Standard	1066MHz	4.8GT/s	Yes	Yes
X5560	2.8GHz	95W	8M	4	Advanced	1333MHz	6.4GT/s	Yes	Yes
E5530	2.4GHz	80W	8M	4	Standard	1066MHz	5.86GT/s	Yes	Yes
L5520	2.26GHz	60W	8M	4	Standard LV	1066MHz	5.86GT/s	Yes	Yes
E5507	2.26GHz	80W	4M	4	Basic	800MHz	4.8GT/s	No	No
E5506	2.13GHz	60W	4M	4	Basic LV	800MHz	4.8GT/s	No	No
E5503	2.0GHz	80W	4M	2	Basic	800MHz	4.8GT/s	No	No

6.4 Processor Installation

For instructions on installing a processor on the PowerEdge M710HD, see the Processors section in the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

7 Memory

7.1 Overview

The Dell™ PowerEdge™ M710HD uses DDR3 memory providing a high performance, high-speed memory interface capable of low latency response and high throughput. The PowerEdge M710HD supports registered ECC DDR3 DIMMs (RDIMM) as well as the low-voltage RDIMMs.

The DDR3 memory interface consists of three channels, with up to three RDIMMs per channel for single/dual rank, and up to two RDIMMs per channel for quad rank. The interface uses 2 GB, 4 GB, 8 GB, or 16GB RDIMMs. The memory mode is dependent on how the memory is populated in the system as detailed below:

- Three channels per processor populated identically:
  - Typically, the system will be set to run in Memory Optimized (Independent Channel) mode in this configuration. This mode offers the most DIMM population flexibility and system memory capacity, but offers the least number of RAS (reliability, availability, service) features.
  - All three channels must be populated identically.
  - Memory sparing is supported on M710HD.
  - Memory sparing requires that all the DIMMs are identically populated in all three channels. One channel will be the spare and not accessible as system memory until brought online to replace a failing channel.
- The first two channels per processor populated identically with the third channel unused:
  - Typically, two channels operate in Advanced ECC (Lockstep) mode with each other by having the cache line split across both channels. This mode provides improved RAS features (SDDC support for x8-based memory).
  - For Memory Mirroring, two channels operate as mirrors of each other—writes go to both channels and reads alternate between the two channels.
- One channel per processor populated:
  - This is a simple Memory Optimized mode. No mirroring or sparing is supported.
  - Low Voltage DIMMs will run at the lower voltage for configurations with one or two DIMMs per channel.
  - Three DIMM per channel configuration of low-voltage DIMMs will run at normal power consumption.

The PowerEdge M710HD memory interface supports memory demand and patrol scrubbing, single-bit correction and multi-bit error detection. Correction of a x4 or x8 device failure is also possible with SDDC in the Advanced ECC mode. Additionally, correction of an x4 device failure is possible in the Memory Optimized mode.

- If DIMMs of different speeds are mixed, all channels will operate at the fastest common frequency.
- If memory mirroring is enabled, identical DIMMs must be installed in the same slots across both channels. The third channel of each processor is unavailable for memory mirroring.
- The first DIMM slot in each channel is color-coded with white ejection tabs for ease of installation.
- The DIMM sockets are placed 380 mils (11.43 mm) or 400 mils apart, center-to-center.

- The M710HD memory system supports up to 18 DIMMs. DIMMs must be installed in each channel starting with the DIMM farthest from the processor. Population order will be identified by the silkscreen designator and the System Information Label (SIL) located on the chassis cover.
  - Memory Optimized or Sparing: {1, 2, 3}, {4, 5, 6}, {7, 8, 9}
  - Advanced ECC or Mirrored: {2, 3}, {5, 6}, {8, 9}

7.2 DIMMs Supported

If DIMMs of different speeds are mixed, all channels operate at the fastest common frequency.

- UDIMMs are not supported.
- The first DIMM slot in each channel is color-coded with white ejection tabs for ease of identification.

The M710HD's DIMM sockets are placed 380 mils (11.43 mm) or 400 mils apart (spacing is increased in some areas to allow for more airflow); center-to-center in order to provide enough space for sufficient airflow to cool stacked DIMMs. DIMMs must be installed in each channel starting with the DIMM farthest from the processor (DIMM1). Population order is identified by silkscreen and a label. The order is dependent on the memory configuration used. For detailed information, see the System Memory section of the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

7.3 DIMM Slots

Figure 3 illustrates the M710HD DIMM slots. For detailed information, see the System Memory section of the *Dell PowerEdge Modular Systems Hardware Owner's Manual* on Support.Dell.com/Manuals.

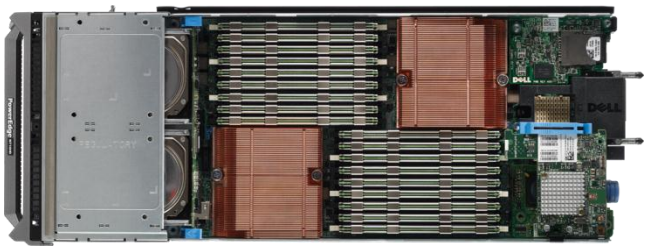

Figure 3. Memory Slots and Risers

7.4 Speed

The memory frequency is determined by a variety of inputs:

- Speed of the DIMMs
- Speed supported by the processor
- Configuration of the DIMMs

Table 7 shows the memory populations and the maximum frequency achievable for that configuration.

For quad-rank DIMMs mixed with single- or dual-rank DIMMs, the quad-rank DIMM needs to be in the slot with the white ejection tabs (the first DIMM slot in each channel). There is no requirement for the order of SR and DR DIMMs.

Table 7. Memory Populations and Maximum Frequency

DIMM Slots per Channel	DIMMs Populated per Channel	DIMM Type	POR Speeds	Ranks per DIMM (any combination)	Population Rules
2	1	Reg. DDR3 ECC	800, 1066, 1333	SR or DR	Any combination of x4 and x8 RDIMMs, with 1Gb, 2Gb, or 4Gb DRAM density Populate DIMMs starting with slot 0, furthest from the CPU
2	1	Reg. DDR3 ECC	800, 1066	QR only	
2	2	Reg. DDR3 ECC	800, 1066, 1333	Mixing SR, DR	
2	2	Reg. DDR3 ECC	800	Mixing SR, DR, QR	
3	1	Reg. DDR3 ECC	800, 1066, 1333	SR or DR	
3	1	Reg. DDR3 ECC	800, 1066	QR only	
3	2	Reg. DDR3 ECC	800, 1066, 1333	Mixing SR, DR	
3	2	Reg. DDR3 ECC	800	Mixing SR, DR, QR	
3	3	Reg. DDR3 ECC	800	Mixing SR, DR	

8 Chipset

8.1 Overview

The Dell™ PowerEdge™ M710HD planar incorporates the Intel® 5520 chipset for I/O and processor interfacing which was designed to support Intel Xeon® Processor 5500 and 5600 series, QuickPath Interconnect, and PCIe Gen2.

8.2 I/O Hub

The M710HD system board uses the Intel 5520 chipset 36D I/O Hub (IOH) to provide a link between the processor(s) and I/O components. The main components of the IOH consist of two full-width QuickPath Interconnect links (one to each processor), 36 lanes of PCIe Gen2, and a x4 Direct Media Interface (DMI) and an integrated IOxAPIC.

8.3 QuickPath Interconnect

The QuickPath Interconnect (QPI) architecture consists of serial point-to-point interconnects for the processors and the IOH. The M710HD has a total of three QPI links: one link connecting the processors and links connecting both processors with the IOH. Each link consists of 20 lanes (full-width) in each direction with a link speed maximum of 6.4 GT/s. An additional lane is reserved for a forwarded clock. Data is sent over the QPI links as packets.

The QuickPath Architecture implemented in the IOH and processors features four layers. The physical layer consists of the actual connection between components. It supports Polarity Inversion and Lane Reversal for optimizing component placement and routing. The Link layer is responsible for flow control and the reliable transmission of data. The Routing layer is responsible for the routing of QPI data packets. Finally, the Protocol layer is responsible for high-level protocol communications, including the implementation of a MESIF (Modify, Exclusive, Shared, Invalid, Forward) cache coherence protocol.

8.4 IOH PCIe

PCIe is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of Gen1 from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports are backwards-compatible with Gen1 transfer rates.

The M710HD uses the Intel 5520 chipset 36D IOH which has one ESI port (port 0) as well as two PCIe Gen2 ports (ports 1,2) and 8 PCIe x4 ports (ports 3-10). Certain adjacent x4 ports can be combined into x8 ports (ports 7-8 and 9-10) the Network Daughter Card ports can also be combined into an x8 port as well

The M710HD blade planers have a dedicated connector for the Network Daughter Card (NDC). Physically, a PCIe -2 x8 connection is routed from IOH to the NDC connector. This connection is dedicated to the M710HD LOM solution. See Table 8.

Table 8. M710HD PCIe Assignments

	Port Number	M710HD
IOH	Port 0	ESI
	Port 1-2	H200
	Port 3	NDC connection
	Port 4	
	Port 5-6	Not Used
	Port 7-8	FAB B
	Port 9-10	FAB C
ICH9	x4 Port 1-4	Unused
	x1 Port 5	Unused
	x1 Port 6	Unused

8.5 Intel I/O Controller Hub 9

The Intel I/O Controller Hub 9 (ICH9) is a highly integrated I/O controller supporting the following functions:

- Six x1 PCIe Gen1 ports with the capability of combining ports 1-4 as a x4 link
- PCI Bus 32-bit Interface Rev 2.3 running at 33MHz
- Serial ATA (SATA) ports with transfer rates up to 300MB/s (M710HD does not support SATA)
- Six UHCI and two EHCI (high-speed 2.0) USB host controllers with up to 12 USB ports (M710HD uses three of these ports for internal and external use)
- Power management interface (ACPI 3.0b compliant)
- Platform Environmental Control Interface (PECI)
- I/O interrupt controller
- SMBus 2.0 controller
- Low Pin Count (LPC) interface to Trusted Platform Module (TPM) and SPI-VU
- Serial Peripheral Interface (SPI) support for up to two devices

8.6 PCIe Gen2

PCIe is a serial point-to-point interconnect for I/O devices. PCIe Gen2 doubles the signaling bit rate of each lane from 2.5 Gb/s to 5 Gb/s. Each of the PCIe Gen2 ports is backwards-compatible with Gen1 transfer rates.

8.7 Direct Media Interface

The Direct Media Interface (DMI) connects the Boxboro-EX Legacy IOH with the Intel I/O Controller Hub (ICH). The DMI is equivalent to a x4 PCIe Gen1 link with a transfer rate of 1 GB/s in each direction.

8.8 PCIe Mezzanine Connectors

The M710HD supports two x8 PCIe Gen2 mezzanine connectors.

9 BIOS

9.1 Overview

The Dell™ PowerEdge™ M710HD BIOS is based on the Dell BIOS core, and supports the following features:

- Intel® Xeon® processor 5500 and 5600 series 2S support
- Simultaneous Multi-Threading (SMT) support
- Processor Turbo Mode support
- PCI 2.3 compliant
- Plug and Play 1.0a compliant
- MP (Multiprocessor) 1.4 compliant
- Boot from hard drive, optical drive, iSCSI drive, USB key, and SD card
- ACPI support
- Direct Media Interface (DMI) support
- PXE, ISCSI, and WOL support for on-board NIC
- Memory mirroring
- SETUP access through F2 key at end of POST
- USB 2.0 (USB boot code is 1.1 compliant)
- F1/F2 error logging in CMOS
- Virtual KVM, CD, and floppy support
- Unified Server Configurator (UEFI 2.1) support
- Power management support including DBS, Power Inventory and multiple Power Profiles

9.2 Supported ACPI States

The M710HD supports the standard Advanced Configuration and Power Interface (ACPI) states. To learn more see www.acpi.info.

10 Embedded LAN on Motherboard

10.1 Overview

The Dell™ PowerEdge™ M710HD supports the following network daughtercards:

- 4 x 1GbE Dual Broadcom® BCM5709S
- 2 x 10GbE Broadcom BCM57712-k

10.2 Broadcom BCM5709S

The BCM5709S provides a complete single-chip dual-port Gigabit Ethernet network controller with TCP Offload Engine (TOE) and iSCSI Offload Engine (iSOE) support is available on the M710HD. The M710HD has two embedded Broadcom BCM5709S dual-port LAN on motherboard (LOM) controllers as independent Gigabit Ethernet interface devices. The BCM5709S features include:

- x4 PCIe Gen2 host interfaces
- Integrated dual-port Layer 4 and Layer 5 solution (TCP/IP, RDMA, and iSCSI)
- Integrated IEEE 802.3-compliant media access control (MAC)
- 3072x18 byte context memory
- 64 KB receive buffer
- TOE (licensed by default)
- iSCSI offload controller (licensed by default)
- NC-SI (Network Controller-Sideband Interface) connection for Flex Addressing
- Wake-On-LAN (WOL)
- PXE 2.0 remote boot
- iSCSI boot
- IPv4 and IPv6 support
- Bare metal deployment support

10.3 Broadcom BCM57712-k NDC

The Broadcom BCM57712-k NDC powers the Broadcom dual-port 10 Gigabit Ethernet network controller with TOE, iSCSI, and FCoE. The BCM57712-k features include:

- x8 PCIe Gen2 host interface
- Broadcom BCM8073 KR PHY for 10GbE and GbE connectivity
- TOE
- iSCSI offload controller
- FCoE offload
- NIC partitioning
- DCB support
- NC-SI connection for Flex Addressing
- WOL
- PXE 2.1 remote boot
- iSCSI boot
- FCoE boot
- IPv4 and IPv6 support
- Bare metal deployment support
- Optional PCI partitioning providing 8 PFs
- SR-IOV
- Energy-efficient Ethernet support

11 I/O Mezzanine Cards

The Dell™ PowerEdge™ M710HD has two PCIe x8 Gen2 mezzanine slots. Installation of mezzanine cards requires an M1000e I/O module (IOM) of the same fabric technology to be installed in the corresponding fabric slot of the mezzanine to support data flow through that fabric slot. See the PowerEdge M1000e Technical Guide for information on IOM options.

The following are the available options for mezzanine cards:

- Broadcom® Dual-Port 5709
- Broadcom Quad-Port 5709
- Intel® ET Quad-Port 82576
- Broadcom Dual-Port 57711
- Intel Ethernet X520 10GbE x/k
- QLogic® CNA QME8142
- Emulex® CNA OCM10102FM
- QLogic QME2572 (FC8)
- Emulex LPe1205 (FC8)
- Mellanox® ConnectX™-2 DDR IB (SFF)
- Mellanox ConnectX-2 QDR IB (SFF)
- Brocade® BR1741M-k

12 Storage

12.1 Drives

The Dell™ PowerEdge™ M710HD supports up to two hot-pluggable 2.5” SAS or SSD hard drives. See Table 9 for information on supported hard drives. For the most up-to-date information on supported hard drives, visit Dell.com.

Table 9. Supported Hard Drives

Form Factor	Capacity	Speed	Type
2.5”	50GB, 100GB, 149GB	N/A	SSD
2.5”	100GB, 146GB, 300GB, 600GB	10K	SAS
2.5”	73GB, 146GB	15K	SAS

12.2 Hard Disk Drive Carrier

The PowerEdge M710HD supports the Dell 2.5” hard drive carrier. Legacy carriers are not supported on M710HD.

Figure 4. 2.5” Hard Drive Carrier

12.3 Empty Drive Bays

For the slots that are not occupied by drives, a carrier blank is provided to maintain proper cooling, maintain a uniform appearance to the unit, and provide EMI shielding.

12.4 Diskless Configuration Support

The system supports diskless configuration with storage controller (PERC H200 or PERC 6/i) installed in the system. A 2.5” hard drive backplane is still installed in this configuration.

12.5 PERC H200 HBA

The M710HD internal PERC H200 HBA incorporates two four-channel SAS IOCs for connection to up to two SAS or SATA SSD hard disk drives. PERC H200 is based on LSI SAS2008e SAS IOC which is SAS 2.0 compliant and has 6Gbps throughput.

The M710HD embedded PERC H200 solution supports the following features:

- PCIe Gen2
- SAS Hard Drive up to 6Gb/s and Solid State Drive (SSD)
- RAID 0 and 1
- Array Management via BIOS Configuration Utility (CTRL+C) and OMSS
- Selection of Preferred Boot Device
- Background Initialization (BGI)
- Consistency Check (CC)
- Check-pointing for Rebuild, BGI and CC
- Reporting of unsupported drives (no blocking)
- Reporting of Negotiated Link Speed
- HDD BP SEP/Status LED support
- Enhanced UEFI/Maser Support

Table 10. Supported Storage Controllers

	Product	Usage	M710HD	Slot	PCI Bracket	I/O Con	RAID	Battery backup
SAS HBA SAS/ SATA	PERC H200 Integrated	Internal Backplane Storage	Yes—Max 1	Embedded	No	x4 integrated mini SAS	0, 1	No

12.5.1 Selecting Preferred Boot Device in H200 Controller

The M710HD PERC H200 controller offers the ability to specify any un-configured Physical Disk or Virtual Disk as a Boot Device regardless of its slot location in the system.

In the SAS Topology screen accessed using CTRL+C, a user can scroll down to either select the desired Physical Disk or Virtual Disk and assign that device as their Preferred Boot Device by pressing ALT+B. The Preferred Boot Device will then be marked as “Boot” under Device Information. ALT+B can be used to deselect a previously selected Preferred Boot Device as well.

If no Boot Device is selected, the controller will boot to the first device discovered or its associated RAID volume.

12.5.2 PERC H200 SAS 6Gb/s

The M710HD H200 6Gbps SAS controller complies with SAS 2.0 and provides up to 6 Gb/s throughput.

For maximum supported throughput, ensure that the correct hardware is used. This includes hard drives, backplanes, enclosures, etc.

12.5.3 PERC H200 Solid State Drive Support

In addition to SAS hard disk drive (HDD) support, the M710HD PERC H200 also offers support for solid state drives (SSDs). The M710HD H200 controller does not support mixing SSDs and SAS HDDs in a RAID volume.

12.6 RAID Configurations

Table 11. RAID Configurations

	Hot Plug	Min HDs	Max HDs	Configs	Description	Factory
0	N	0	0	ZERO	Diskless Configuration, No modular	√
1	N	1	2	MSSN	SATA HDD/SAS drives using SATA/SAS HDD/SSD drives using H200 Modular with no RAID	√
2	Y	2	2	MSSR1	SATA/SAS drives using SATA/SAS HDD/SSD drives using H200 Modular with drives in a RAID 1 mirror	√
3	N	2	2	MSSR0	SATA/SAS drives using SATA/SAS HDD/SSD drives using H200 Modular with drives in a RAID 0 stripe	√

12.7 Optical Drives

Optical drives are optional in all M710HD systems and connect to the blade through the front USB interface. The following internal slim-line drives are available on M710HD: DVD-ROM and DVD+RW. PATA (IDE) optical drives are not supported.

12.8 External Storage

A number of external storage options are available using the appropriate IOMs in the M1000e chassis and mezzanine card(s) in the M710HD blade. See Dell.com/Storage for more information.

13 Video

The Dell™ PowerEdge™ M710HD Integrated Dell Remote Access Controller 6 (iDRAC6) incorporates an integrated video subsystem, connected to the 32-bit PCI interface of the ICH9. This logic is based on the Matrox® G200. The device only supports 2D graphics.

The integrated video card shares its video memory with the iDRAC6's 128 MB DDR2 application space memory. This memory is also used for the KVM buffer.

The M710HD system supports the 2D graphics video modes shown in Table 12.

Table 12. Supported Video Modes

Resolution	Refresh Rate (Hz)	Color Depth (bit)
640 x 480	60, 72, 75, 85	8, 16, 32
800 x 600	56, 60, 72, 75, 85	8, 16, 32
1024 x 768	60, 72, 75, 85	8, 16, 32
1152 x 864	75	8, 16, 32
1280 x 1024	60, 75, 85	8, 16
1280 x 1024	60	32

14 Rack Information

For information on rack and cable accessories for the Dell™ PowerEdge™ M710HD, see the latest options on Dell.com.

15 Operating Systems

The Dell™ PowerEdge™ M710HD is designed to meet the MSFT WinLogo 3.0 design specifications. For the most up-to-date information, see the Operating System Support Matrix for Dell PowerEdge Systems on Dell.com.

16 Virtualization

16.1 Resources

For the most up-to-date information, see the following resources:

- Operating System Support Matrix for Dell PowerEdge Systems on Dell.com
- VMware for a compatibility list
- Support.dell.com offers extensive information designed to help customers configure virtualization software with PowerEdge servers and blade-related virtualization documents
- Dell Virtualization Solution Advisor on dell.com on Dell.com offers virtualization configuration solutions
- Virtualization platforms supported by OpenManage

16.2 Advanced Infrastructure Manager by Scalent

Dell Advanced Infrastructure Manager (AIM) allows IT organizations to manage networking, storage, and servers (as well as server workloads) that can be dynamically reconfigured and deployed to meet the changing needs of today's data center environment. Specifically, AIM provides IT professionals the ability to:

- Combine new and existing networking, storage devices, and servers into a holistic computing solution that enables dynamic allocation of resources to meet application workload requirements.
- Manage physical and virtual resources with a single solution that includes the ability to move workloads seamlessly across hardware platforms for increased availability and scalability.
- Provide virtualization-like functionality to non-virtual (physical) servers, including automated failover, dynamic load balancing, and business continuity.
- Integrate existing infrastructure (networking, storage devices, and servers) into an AIM solution to provide investment protection and extend the useful life of existing data center assets.
- Significantly decrease the amount of time and people required to deploy hardware and get applications up and running by providing a repeatable, scalable framework for hardware implementation using AIM.

More information can be found at Dell.com/AIM.

16.3 Vizioncore

Vizioncore's easy-to-use virtualization software products support business continuity and disaster recovery, high availability, monitoring, automation, P2V and optimization. The software is agent-less and can co-exist with other leading backup software vendors, or be used as a standalone solution.

- vRanger™ Pro is a backup and restore solution for virtualized environments.
- vFoglight™ Standard and Professional editions help organizations monitor, understand and analyze their virtual infrastructure by managing the relationships and interaction between all the components in the virtual environment.
- vConverter™ helps convert servers to the VMware, Microsoft, XenServer or Virtual Iron platforms.
- vReplicator is a host-level software-based replication solution for VMware infrastructure which enables companies to leverage virtualization to support High Availability (HA) and Disaster Recovery (DR) strategies.

Dell

- Vizioncore™ vOptimizer Pro helps administrators understand storage utilization so they can make real-time adjustments in allocations. It presents the financial impact of reclaimed storage per virtual machine (VM), per host, and cumulative cost savings across the enterprise through historical detailed reports.
- vControl is a VM management solution that provides self-service provisioning, multi-VM control and task-based automation. vControl lets VM consumers build and deploy VMs for themselves, while providing administrators a single interface for task-based administration of VMs.
- Vizioncore vEssentials™ is a software bundle of vFoglight Pro, vRanger Pro and vReplicator.

More information can be found at http://vizioncore.com/asg/.

17 Systems Management

17.1 Overview

Dell delivers open, comprehensive, and integrated solutions that help you reduce the complexity of managing disparate IT assets. Combining Dell™ PowerEdge™ servers with a wide selection of Dell developed systems management solutions gives you choice and flexibility, so you can simplify and save in IT environments of any size. To help you meet your server management demands, Dell offers Dell OpenManage™ systems management solutions for:

- Deployment of one or many servers from a single console
- Monitoring of server and storage health and maintenance
- Update of system, operating system, and application software

Dell offers IT management solutions for organizations of all sizes—priced and sized appropriately, and supported comprehensively.

17.2 Server Management

A Dell Systems Management and Documentation DVD, Dell Management Console DVD, and ISO images are included with the product. See Table 13 for a description of the available content.

Table 13. Server Management Documentation and Information

Title	Description
Dell Systems Build and Update Utility (SBUU)	Assists in OS install and pre-OS hardware configuration and updates.
Server Update Utility (SUU)	Provides an inventory tool for managing updates to firmware, BIOS, and drivers for either Linux or Windows varieties.
OpenManage Server Administrator (OMSA)	Provides a comprehensive, one-to-one (one console to one server) systems management solution, designed for system administrators to manage systems locally and remotely over a network. OMSA allows system administrators to focus on managing their entire network by providing comprehensive one-to-one systems management.
Management Console	Dell IT Assistant (ITA) is also included, as well as tools to allow access to our remote management products. These tools are Remote Access Service for iDRAC and the Baseboard Management Controller (BMC) Utility.
Active Directory Snap-in Utility	Provides an extension snap-in to the Microsoft Active Directory. This allows you to manage Dell specific Active Directory objects. The Dell-specific schema class definitions and their installation are also included on the DVD.
Dell Systems Service Diagnostics Tools	Deliver the latest Dell optimized drivers, utilities, and operating system-based diagnostics that you can use to update your system.
eDocs	Includes PDF files for PowerEdge systems, storage peripherals, and Dell OpenManage™ software.
Dell Management Console (DMC)	Provides a systems management console that enables systems administrators to discover and inventory devices on your network. It provides functions such as health and performance monitoring of networked devices and patch management

Title	Description
	capabilities for Dell systems. DMC differs from the IT Assistant management console (described above) in that with DMC, value-add plug-ins that enable advanced functionality can be purchased and added to the base DMC product.

17.3 Embedded Server Management

The PowerEdge M710HD implements circuitry for the next generation of Embedded Server Management. It is Intelligent Platform Management Interface (IPMI) v2.0 compliant. The iDRAC (Integrated Dell Remote Access Controller) is responsible for acting as an interface between the host system and its management software and the periphery devices.

iDRAC6 provides features for managing the server remotely or in data center lights-out environments.

Advanced iDRAC features require the installation of the optional iDRAC6 Enterprise card.

17.4 Dell Lifecycle Controller and Unified Server Configurator

Embedded management is comprised of interdependent pieces:

- Dell Lifecycle Controller
- Unified Server Configurator
- iDRAC6

Dell Lifecycle Controller powers the embedded management features. It includes integrated and tamper-proof storage for system-management tools and enablement utilities (firmware, drivers, etc.). Lifecycle Controller enables pre-OS server deployment, OS installation, platform updates, platform configuration, and diagnostics capabilities.

Dell Unified Server Configurator (USC) is a graphical user interface (GUI) that aids in local server provisioning in a pre-OS environment. To access the Unified Server Configurator, press the <F10> key within 10 seconds of the Dell logo appearance during the system boot process. Table 14 details current functionality enabled by the USC.

Table 14. Unified Server Configurator Features and Description

Feature	Description
Faster O/S Installation	Drivers and the installation utility are embedded on system, so no need to scour Dell.com.
Faster System Updates	Integration with Dell support automatically directed to latest versions of the Unified Server Configurator, iDRAC, RAID, BIOS, NIC, and power supply.
Update Rollback	Ability to recover to previous “known good state” for all updatable components.
More Comprehensive Diagnostics	Diagnostic utilities are embedded on system.
Simplified Hardware Configuration	Detects RAID controller and allows user to configure virtual disk and choose virtual disk as boot device, eliminating the need to launch a separate utility. Also provides configuration for iDRAC, BIOS, and NIC/LOM.

17.5 Integrated Dell Remote Access Controller

The integrated Dell Remote Access Controller (iDRAC6) provides IT Administrators comprehensive yet straightforward management of remote servers, by delivering “as if you are there” presence and control. iDRAC6 helps users to save time and money by eliminating travel to the remote server(s), whether that server is located in a different room, a different building, a different city, or in a different country.

iDRAC6 Enterprise is a standard feature on the M710HD, and Virtual Flash (vFlash) media is a purchasable option.

17.6 iDRAC6 Enterprise

The iDRAC6 Enterprise card provides access to advanced iDRAC6 features. The iDRAC6 Enterprise connects directly to the M710HD planar and is mounted parallel to the planar with stand-offs.

Key features for the iDRAC6 Enterprise include:

- Scripting capability with Dell’s Racadm command-line
- Remote video, keyboard, and mouse control with Virtual Console
- Remote media access with Virtual Media
- Dedicated network interface

17.7 iDRAC6 Enterprise with Virtual Flash Media

The iDRAC6 Enterprise can be upgraded by adding the virtual flash (vFlash) media card. This is an 8 GB Dell-branded SD card that enables a persistent 256 MB virtual flash partition. The vFlash media delivers the following key features:

- Support for 8 GB SD storage media
- Can be used as a repository for a pre-OS image, eliminating the need to maintain a network infrastructure for OS deployment
- Can also be used for permanent diagnostics image for use after system failures, or permanent failsafe image for periodic configuration changes

A more detailed feature list for base management functionality, iDRAC6 Enterprise, and vFlash media is shown in Table 15.

Table 15. Features List for Base Management Functionality, iDRAC, and vFlash Media

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Interface and Standards Support			
IPMI 2.0	✓	✓	✓
Web-based GUI		✓	✓
SNMP		✓	✓
WSMAN		✓	✓
SMASH-CLP		✓	✓
Racadm command-line		✓	✓

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Conductivity			
Shared/Failover Network Modes	✓	✓	✓
IPv4	✓	✓	✓
VLAN Tagging	✓	✓	✓
IPv6		✓	✓
Dynamic DNS		✓	✓
Dedicated NIC		✓	✓
Security and Authentication			
Role-based Authority	✓	✓	✓
Local Users	✓	✓	✓
Active Directory		✓	✓
SSL Encryption		✓	✓
Remote Management and Remediation			
Remote Firmware Update	✓	✓	✓
Server power control	✓	✓	✓
Serial-over-LAN (with proxy)	✓	✓	✓
Serial-over-LAN (no proxy)		✓	✓
Power capping		✓	✓
Last crash screen capture		✓	✓
Boot capture		✓	✓
Serial-over-LAN		✓	✓
Virtual media		✓	✓
Virtual console		✓	✓
Virtual console sharing		✓	✓
Virtual flash			✓
Monitoring			
Sensor Monitoring and Alerting	✓	✓	✓
Real-time Power Monitoring		✓	✓
Real-time Power		✓	✓

Feature	Base Management Functionality	iDRAC6 Enterprise	vFlash Media
Graphing			
Historical Power Counters		✓	✓
Logging Features			
System Event Log	✓	✓	✓
RAC Log		✓	✓
Trace Log		✓	✓

17.8 Chassis Management Controller

For more information about the chassis management controller (CMC) for the PowerEdge M710HD, see the PowerEdge M1000e Technical Guide.

18 USB Peripherals

The Dell™ PowerEdge™ M710HD provides an internal USB connector for a USB flash memory key. The USB memory key can be used as a boot device, security key, or mass storage device.

Appendix A. Statement of Volatility

The Dell™ PowerEdge™ M710HD blade and its configurable modules contain both volatile and non-volatile (NV) components. Volatile components lose their data immediately upon removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component. Dell PowerEdge blades may contain hard disk drives that retain customer data after the system is powered off. Data should be removed from these hard disk drives using locally approved methods before they are removed from a secured environment.

Table 16. PowerEdge M710HD Statement of Volatility

Server BIOS Memory	**Details**
Size	4MB
Type	SPI Flash
Purpose	There is boot code and application code. The code is vital to the system booting to the OS. Contains the BIOS code.
Can user programs or operating system write data to it during normal operation?	No
How is data input to this memory?	Flashed in the factory or using Dell flash utility
How is this memory write protected?	Software write protected
System FRU	**Details**
Size	256Kb
Type	Serial I2C EEPROM, nonvolatile
Purpose	This chip stores some system configuration information (system type, board PPID information, etc.)
Can user programs or operating system write data to it during normal operation?	Yes; a user can enter a username and password which will be stored in the chip
How is data input to this memory?	I2C bus from the iDRAC6
How is this memory write protected?	Only the iDRAC6 can write to the chip
Server CMOS (Complementary Metal-Oxide Semiconductor) Memory	**Details**
Size	256 bytes
Type	CMOS
Purpose	BIOS configurations
Can user programs or operating system write data to it during normal operation?	Using BIOS setup
How is data input to this memory?	BIOS defaults, BIOS setup
How is this memory write protected?	NA
Remarks	RTC is inside ICH9; jumper on motherboard can be used to reset to factory default settings

Network Daughter Card LOM Memory	Details
Size	4Mb
Type	Flash
Purpose	Contains LOM boot code and config data
Can user programs or operating system write data to it during normal operation?	Yes, under software control
How is data input to this memory?	Requires vendor provided firmware file and loader program used during factory assembly or possible field update; a system loaded with arbitrary data in firmware memory would not operate
How is this memory write protected?	Software control
Network Daughtercard FRU and Temperature Sensor	**Details**
Size	512bytes
Type	EEPROM
Purpose	Contains firmware for FRU and temperature sensor processing
Can user programs or operating system write data to it during normal operation?	No
How is data input to this memory?	Boot block is cable flashed only; FRU and temperature registers are accessed through iDRAC6 I2C
How is this memory write protected?	Software control
H200 SRAM	**Details**
Size	128K Bytes
Type	Serial RAM
Purpose	Storage configuration data
Can user programs or operating system write data to it during normal operation?	No
Does it retain data when powered off?	Yes
How is data input to this memory?	Host controller through SDRAM bus
How is this memory write protected?	Software write protected
H200 Flash	**Details**
Size	64Mb
Type	Flash
Purpose	H200 Firmware
Can user programs or operating system write data to it during normal operation?	No
Does it retain data when powered off?	Yes
How is data input to this memory?	Host controller

How is this memory write protected?	Software write protected
H200 EEPROM	
Size	64KB
Type	EEPROM
Purpose	Store board manufacture information
Can user programs or operating system write data to it during normal operation?	Yes
Does it retain data when powered off?	Yes
How is data input to this memory?	I2C bus from iDRAC6
How is this memory write protected?	Only the iDRAC6 can write to the chip
EDID EEPROM	
Size	2K
Type	EEPROM
Purpose	Stores current monitor information
Can user programs or operating system write data to it during normal operation?	No
Does it retain data when powered off?	Yes
How is data input to this memory?	I2C bus from iDRAC6
How is this memory write protected?	No
Server Video Memory	**Details**
Size	64M x16
Type	DDR2 SDRAM
Purpose	Graphics Buffer
Can user programs or operating system write data to it during normal operation?	Yes
How is data input to this memory?	Normal Operation
How is this memory write protected?	No
CPLD	**Details**
Size	2280 logic elements; 7.5Kbits RAM; 27.6Kbits EBR SRAM
Type	Programmable Logic Device
Purpose	Provide blade power sequencing and other blade control logic
Can user programs or operating system write data to it during normal operation?	Yes (customer can use DOS program to update CPLD image)
How is data input to this memory?	By way of specialized programming utilities used in the factory and possibly for field updates
How is this memory write protected?	Software control

HDD Backplane Firmware (SEP) Memory	Details
Size	32KB
Type	Flash
Purpose	Interface between the RAID controller and the hard drives as well as a controller for the HDD status LED
Can user programs or operating system write data to it during normal operation?	No; a special (not available to customers) DOS utility is needed to flash the application code, and the boot block is cable flashed only
How is data input to this memory?	Cable flash to flash entire chip or a special utility (not available to customers) to flash in DOS
How is this memory write protected?	Software write protected; no hardware protection pin
iDRAC6 Enterprise SPI Flash	**Details**
Size	2MB
Type	SPI Flash
Purpose	There is boot code that is used by the iDRAC6 Enterprise management controller. Also contains the Life Cycle Log which contains server management data unique to the run-time events of the server itself.
Can user programs or operating system write data to it during normal operation?	No
How is data input to this memory?	Flashed in the factory or using Dell flash utility. Also written to by the iDRAC6 Enterprise controller to make Life Cycle Log (LCL) entries.
How is this memory write protected?	Software write protected
TPM (for boards shipped outside of China)	**Details**
Size	Unspecified size of user ROM, RAM, EEPROM; 128 bytes of OTP memory included
Type	ROM, RAM, EEPROM
Purpose	Trusted Platform Module NV storage. May be used to securely store user data.
Can user programs or operating system write data to it during normal operation?	Yes, OSes and applications that conform to the TCG standard can write data to the TPM during normal operation. Access to the NV Storage is controlled by the TPM owner.
How is data input to this memory?	TCG TPM Specification defined command interface.
How is this memory write protected?	As defined by the TCG TPM Specification, protection of this NV memory area is configurable by the TPM owner.

iDRAC6 Enterprise Card FRU	Details
Size	2Kb (256 bytes)
Type	Serial I2C EEPROM, nonvolatile
Purpose	This chip stores some system configuration information (system type, board PPID information, etc.)
Can user programs or operating system write data to it during normal operation?	No. A special (not available to customers) DOS utility is needed to flash the application code.
How is data input to this memory?	I2C bus from the iDRAC
How is this memory write protected?	Only the iDRAC can write to the chip
iDRAC6 Enterprise Card eMMC	**Details**
Size	1GB
Type	NAND Flash
Purpose	Stores the iDRAC6 kernel and other data for system management
Can user programs or operating system write data to it during normal operation?	Yes, under software control
How is data input to this memory?	I2C bus from the iDRAC
How is this memory write protected?	Only the iDRAC can write to the chip
iDRAC6 Enterprise Card MCU	**Details**
Size	256Kbytes
Type	Flash
Purpose	RIPS FW
Can user programs or operating system write data to it during normal operation?	Yes
How is data input to this memory?	USB: Special Dell utility required for programming
How is this memory write protected?	Software protected
iDRAC6 Enterprise Card SPI Flash	**Details**
Size	64Mb
Type	SPI Flash
Purpose	SD RAID write log
Can user programs or operating system write data to it during normal operation?	No
How is data input to this memory?	SPI interface from MCU
How is this memory write protected?	None

Appendix B. Certifications

B 1. Regulatory Certifications

Regulatory compliance certificates can be located at the following sites:

- http://ausreactorprd01/reactor/xCertSearch.asp
- http://www.dell.com/content/topics/global.aspx/about_dell/values/regulatory_compliance/dec_conform?c=us&l=en&s=corp

B 2. Product Safety Certifications

The product has been certified and bears the Mark, as applicable, of the Product Safety authorities as indicated in Table 17.

Table 17. Product Safety Certifications

Country/Region	Authority or Mark
Argentina	IRAM
Belarus	BELLIS
Canada	SCC
China	CNCA or CCC
Croatia	KONCAR
European Union	CE
Germany	TUV
IECEE	IECEE CB
Israel	SII
Kazakhstan	OTAN – CKT
Kenya	KEBS
Kuwait	KUCAS
Mexico	NYCE or NOM
Moldova	INSM
Nigeria	SONCAP
Norway	NEMKO
Russia	GOST
Saudi Arabia	KSA ICCP
South Africa	NRCS
Taiwan	BSMI
Ukraine	UKRTEST or UKRSERTCOMPUTER
United States	NRTL
Uzbekistan	STZ

B 3. Electromagnetic Compatibility

The product has been certified and bears the Mark, as applicable, of the EMC authorities as indicated in Table 18.

Table 18. Electromagnetic Compatibility Certifications

Country/Region	Authority or Mark	Class
Australia/New Zealand	ACMA or C-Tick	Class A
Belarus	BELLIS	Class A
Bosnia & Herzegovina, Montenegro, Serbia	KVALITET	Class A
Canada	ICES	Class A
China	CNCA or CCC	Class A
Croatia	KONCAR	Class A
European Union	CE	Class A
Israel	SII	Class A
Japan	VCCI	Class A
Kazakhstan	OTAN – CKT	Class A
Moldova	INSM	Class A
Norway	NEMKO	Class A
Russia	GOST	Class A
South Africa	SABS	Class A
South Korea	KCC	Class A
Taiwan	BSMI	Class A
Ukraine	UKRTEST or UKRSERTCOMPUTER	Class A
United States	FCC	Class A
Uzbekistan	STZ	Class A
Vietnam	ICT	Class A

B 4. Ergonomics, Acoustics and Hygienics

The product has been certified and bears the Mark, as applicable, of the Ergonomics, Acoustics and Hygienics authorities as indicated in Table 19.

Table 19. Ergonomics, Acoustics and Hygienics

Country/Region	Authority or Mark
Belarus	BELLIS
Germany	GS
Russia	GOST

Appendix C. Industry Standards

The Dell™ PowerEdge™ M710HD conforms to the industry standards shown in Table 20.

Table 20. Industry Standards

Standard	URL for Information and Specifications
ACPI Advance Configuration and Power Interface Specification, v2.0c	http://www.acpi.info/
Energy Star EPA Version 1.0 of the Computer Server specification	http://www.energystar.gov/index.cfm?c=archives.enterprise_servers
Ethernet IEEE 802.3-2005	http://standards.ieee.org/getieee802/802.3.html
IPMI Intelligent Platform Management Interface, v2.0	http://www.intel.com/design/servers/ipmi/
DDR3 Memory DDR3 SDRAM Specification, Rev. 3A	http://www.jedec.org/download/search/JESD79-3A.pdf
LPC Low Pin Count Interface Specification, Rev. 1.1	http://developer.AMD.com/design/chipsets/industry/lpc.htm
PCI Express PCI Express Base Specification Rev. 2.0	http://www.pcisig.com/specifications/pciexpress/
PMBus Power System Management Protocol Specification, v1.1	http://pmbus.info/specs.html
SAS Serial Attached SCSI, v1.1	http://www.t10.org/cgi-bin/ac.pl?t=f&f=sas1r10.pdf
SATA Serial ATA Rev. 2.6; SATA II, Extensions to SATA 1.0a, Rev. 1.2	http://sata-io.org/
SMBIOS System Management BIOS Reference Specification, v2.6	http://www.dmtf.org/standards/smbios/
TPM Trusted Platform Module Specification, v1.2	http://www.trustedcomputinggroup.org/resources/tpm_main_specification
UEFI Unified Extensible Firmware Interface Specification, v2.1	http://www.uefi.org/specs/

Standard	URL for Information and Specifications
USB Universal Serial Bus Specification, Rev. 2.0	http://www.usb.org/developers/docs/
Microsoft® Windows® Logo Windows Logo Program System and Device Requirements, v3.10	http://www.microsoft.com/whdc/winlogo/hwrequirements.mspx